WHAT ARE CLAIMED ARE:

1. An electric charge transfer apparatus, comprising:

a plurality of vertical charge transfer devices, each of which transfers a signal electric charge;

a plurality of charge-discharging circuits formed next to each vertical transfer device, each charge-discharging circuit discharging the signal electric charge transferred by at least either one of the adjoining vertical transfer devices; and

an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to an outside of the electric charge transfer apparatus.

2. An electric charge transfer apparatus according to claim 1, wherein

said vertical charge transfer devices are configured in parallel to each another, and

a charge-discharging direction of at least one of the charge-discharging circuits formed next to each vertical transfer device is an opposite direction of a charge-discharging direction of other charge-discharging circuits formed next to the same vertical transfer device.

3. An electric charge transfer apparatus according to claim 1, wherein said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit corresponding to the same vertical charge transfer device.

4. An electric charge transfer apparatus according to claim 3, wherein a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.

5. An electric charge transfer apparatus according to claim 1, wherein said charge-discharging circuit comprises a control gate that controls discharging of electric charge independently from other charge-discharging circuit corresponding to the same vertical charge transfer device.

6. A solid-state imaging device, comprising:

a semiconductor substrate;

a plurality of photoelectric conversion elements formed on said semiconductor substrate;

a plurality of vertical charge transfer device formed above said semiconductor substrate, which transfer signal electric charge photoelectric converted by said photoelectric conversion elements;

a plurality of charge-discharging circuits formed next to each vertical transfer device, each charge-discharging circuit discharging the signal electric charge converted by the photoelectric conversion element at a predetermined position and transferred by at least either one of the adjoining vertical transfer devices; and

an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to outside.

7. An electric charge transfer apparatus according to claim 6, wherein

said vertical charge transfer devices are configured in parallel to each another, and

a charge-discharging direction of at least one of the charge-discharging circuits formed next to each vertical transfer device is an opposite direction of a charge-discharging direction of other charge-discharging circuits formed next to the same vertical transfer device.

8. An electric charge transfer apparatus according to claim 6, wherein said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit corresponding to the same vertical charge transfer device.

9. An electric charge transfer apparatus according to claim 8, wherein a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.

10. An electric charge transfer apparatus according to claim 6, wherein said charge-discharging circuit comprises a control gate that controls discharging of electric charge independently from other charge-discharging circuit corresponding to the same vertical charge transfer device.

11. An electric charge transfer apparatus, comprising:

a plurality of vertical charge transfer devices, each of which has plural lines of charge transfer electrodes and transfers signal electric charge;

a plurality of charge-discharging circuits arranged to each line of the charge transfer electrodes, each of the charge-discharging circuit selectively discharging the signal electric charge transferred by the vertical charge transfer device to a discharging direction different from other charge-discharging circuit; and

an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to an outside of the electric charge transfer apparatus.

12. An electric charge transfer apparatus according to claim 11, wherein

said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit corresponding to the same vertical charge transfer device, and

a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.

13. A solid-state imaging device, comprising:

a semiconductor substrate;

a plurality of photoelectric conversion elements formed on said semiconductor substrate;

a plurality of vertical charge transfer device formed above said semiconductor substrate, which transfer signal electric charge

photoelectric converted by said photoelectric conversion elements;

a plurality of charge-discharging circuits arranged to each line of the charge transfer electrodes, each of the charge-discharging circuit selectively discharging the signal electric charge converted by the photoelectric conversion element at a predetermined position and transferred by the vertical charge transfer device to a discharging direction different from other charge-discharging circuit; and

an output circuit that outputs the signal electric charge transferred by the vertical charge transfer devices to an outside of the electric charge transfer apparatus.

14. An electric charge transfer apparatus according to claim 13, wherein

said charge-discharging circuit comprises an overflow drain shared with other charge-discharging circuit corresponding to the same vertical charge transfer device, and

a number of said overflow drain is about a half of a number of columns of the said vertical transfer devices.